Table B-7:

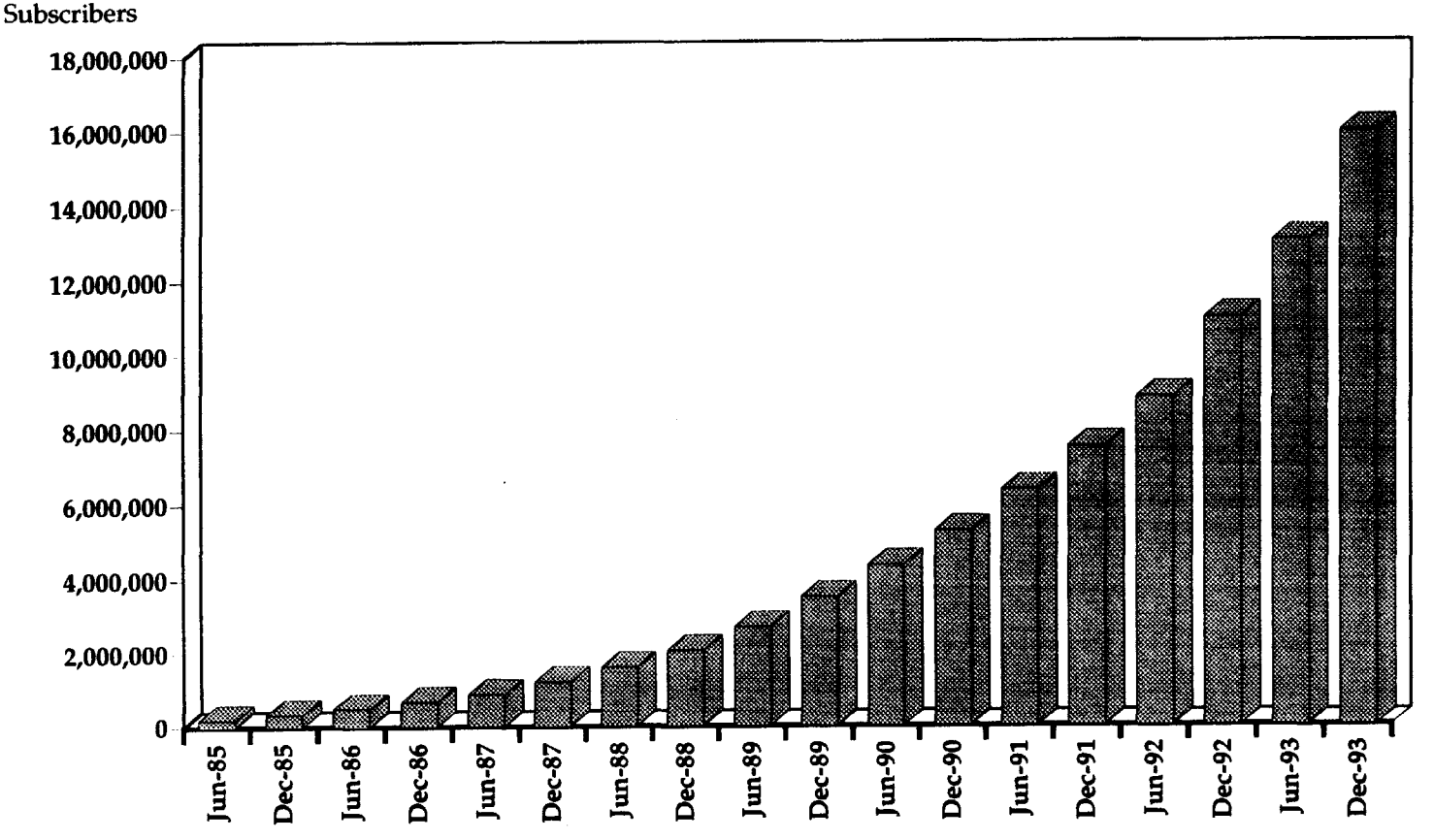
PBX-Centrex Installed Base, 1986-1997*

(Thousands of lines)	1992	1993	1994	1995	1996	1997	CAGR
PBX	27,439	29,251	31,088	32,950	34,787	36,598	5.93%
Centrex	8,770	8,878	9,556	10,287	11,076	11,929	6.34%

* 1993-1997 are projections

Source: NATA Market Research Department

Figure B-7:
Cellular Subscriber Growth, June 1985 - December 1993



Source: CTIA End-of-Year Data Survey

Table B-8:

Cellular Industry Growth, 1985-1993

Date	Subscribers	Six-Month Revenues	Roamer Services	Cell Sites	Employees	Cumulative Capital Investment	No. of Systems	Avg. Bill (mon)	Average Call Length
Jun-85	203,600	$176,231,000		599	1,697	$588,751,000	65		
Dec-85	340,213	$306,197,000		913	2,727	$911,167,000	102		
Jun-86	500,000	$360,197,000		1,194	3,556	$1,140,163,000	129		
Dec-86	681,825	$462,467,000		1,531	4,334	$1,436,753,000	166		
Jun-87	883,778	$479,514,000		1,732	5,656	$1,724,348,000	206		
Dec-87	1,230,855	$672,005,000		2,305	7,147	$2,234,635,000	312	$96.83	2.33
Jun-88	1,608,697	$886,075,000		2,789	9,154	$2,589,589,000	420	$95.00	2.25
Dec-88	2,069,441	$1,073,473,000	$89,331,000	3,209	11,400	$3,274,105,000	517	$98.02	2.26
Jun-89	2,691,793	$1,406,463,000	$121,368,000	3,577	13,719	$3,675,473,000	559	$85.52	2.35
Dec-89	3,508,944	$1,934,132,000	$173,199,000	4,169	15,927	$4,480,141,752	584	$89.30	2.48
Jun-90	4,368,686	$2,126,362,000	$192,350,000	4,768	18,973	$5,211,765,025	592	$83.94	2.32
Dec-90	5,283,055	$2,422,458,000	$263,660,000	5,616	21,382	$6,281,596,000	751	$80.90	2.20
Jun-91	6,390,053	$2,653,505,000	$302,329,000	6,685	25,545	$7,429,739,000	1,029	$80.90	2.20
Dec-91	7,557,148	$3,055,017,000	$401,325,000	7,847	26,327	$8,671,544,000	1,252	$72.74	2.38
Jun-92	8,892,535	$3,633,285,000	$436,725,000	8,901	30,595	$9,276,139,000	1,483	$68.51	2.38
Dec-92	11,032,753	$4,189,441,000	$537,146,000	10,307	34,348	$11,262,070,000	1,506	$68.68	2.58
Jun-93	13,067,318	$4,819,259,000	$587,347,000	11,551	36,501	$12,775,967,000	1,523	$67.31	2.38
Dec-93	16,009,461	$6,072,906,000	$773,269,000	12,805	39,775	$13,946,406,629	1,529	$61.48	2.41

Source: Cellular Telecommunications Industry Association, End-of-Year Data Survey

Figure B-8

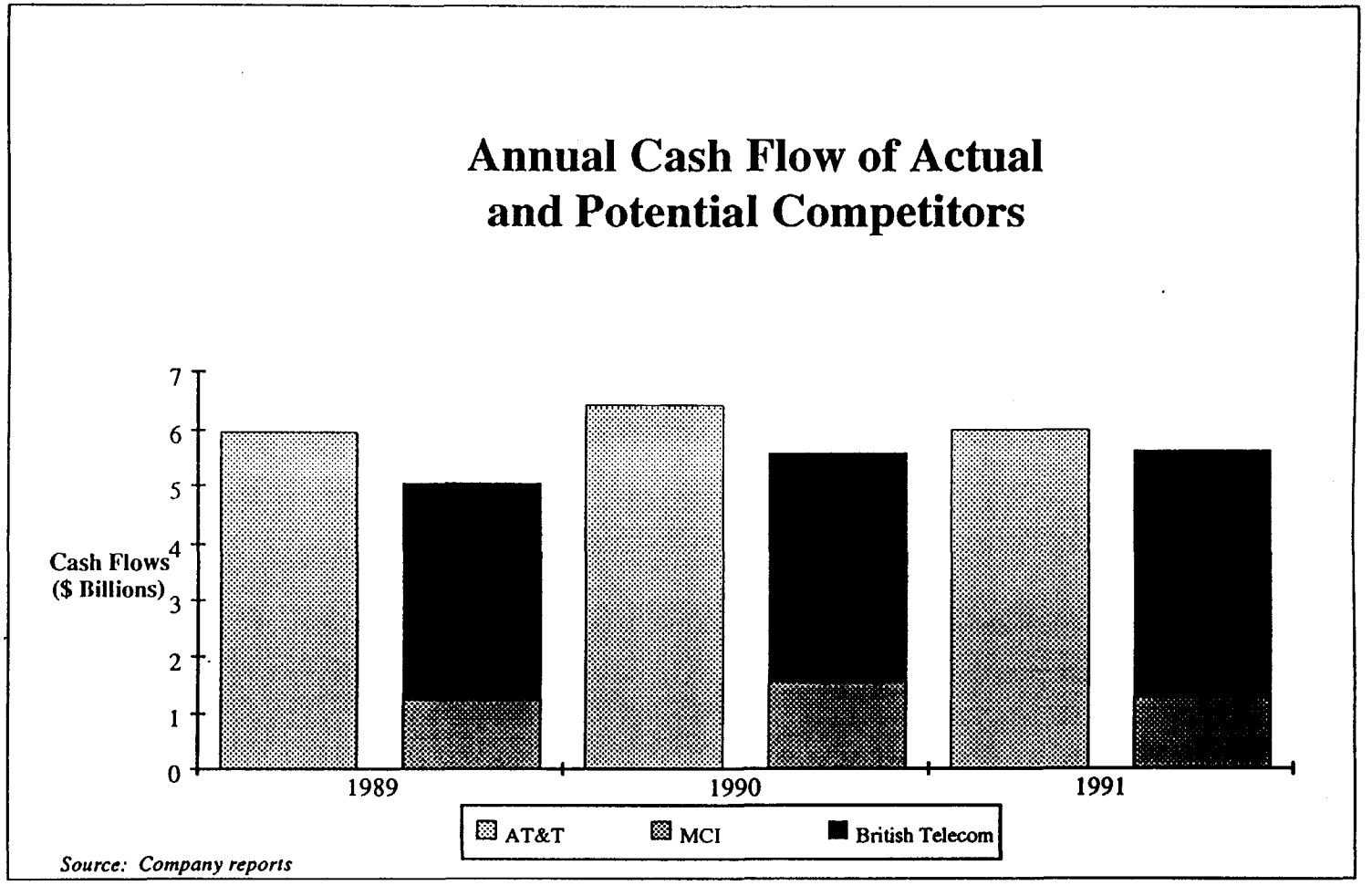

Annual Cash Flow of Actual
and Potential Competitors
Cash Flows
($ Billions)
7
6
5
4
3
2
1
0
1989
1990
1991
AT&T
MCI
British Telecom
Source: Company reports

Figure B-9a

Vertical Relationships: AT&T

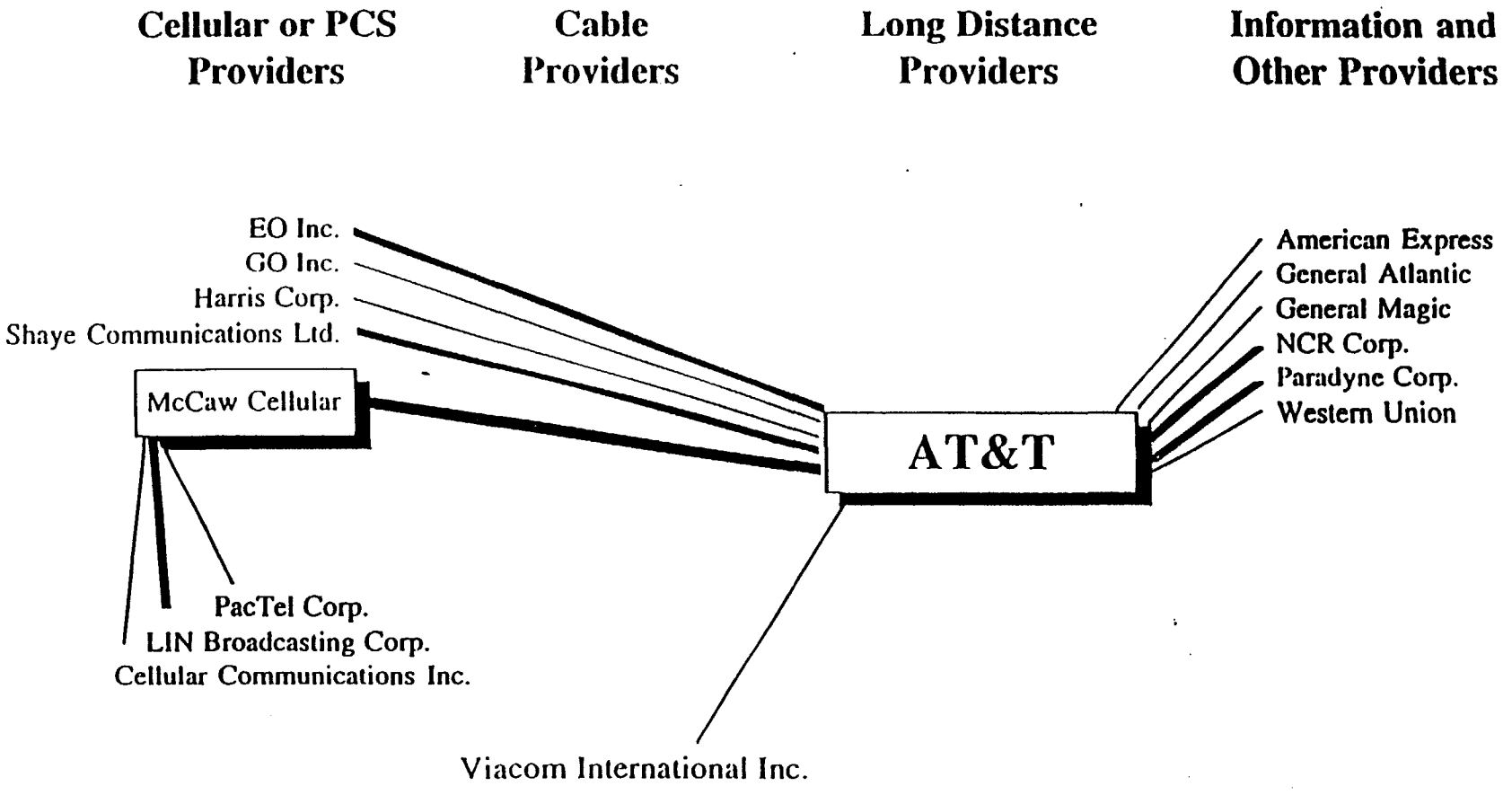


Figure B-9b

Vertical Relationships: MCI

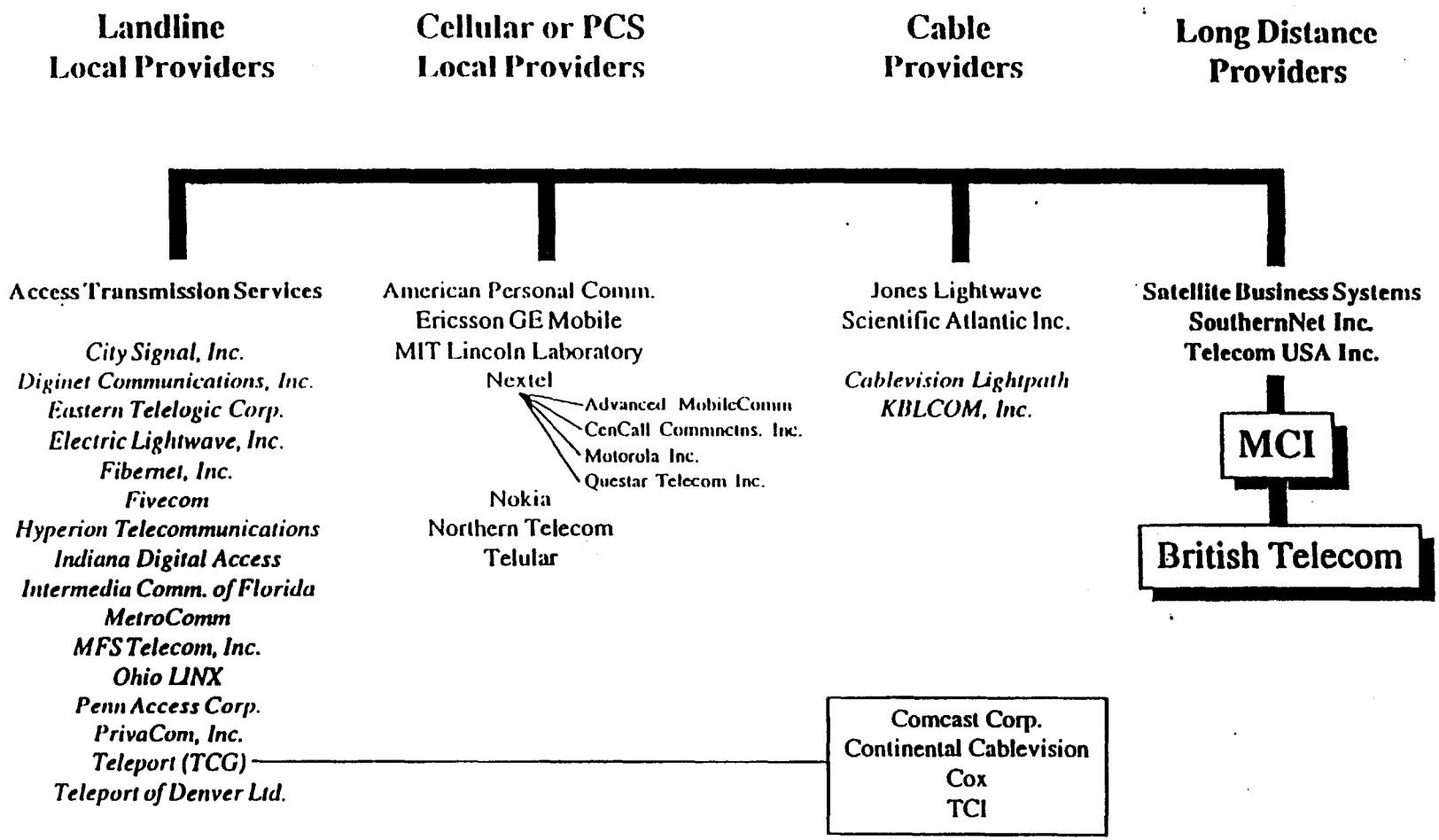
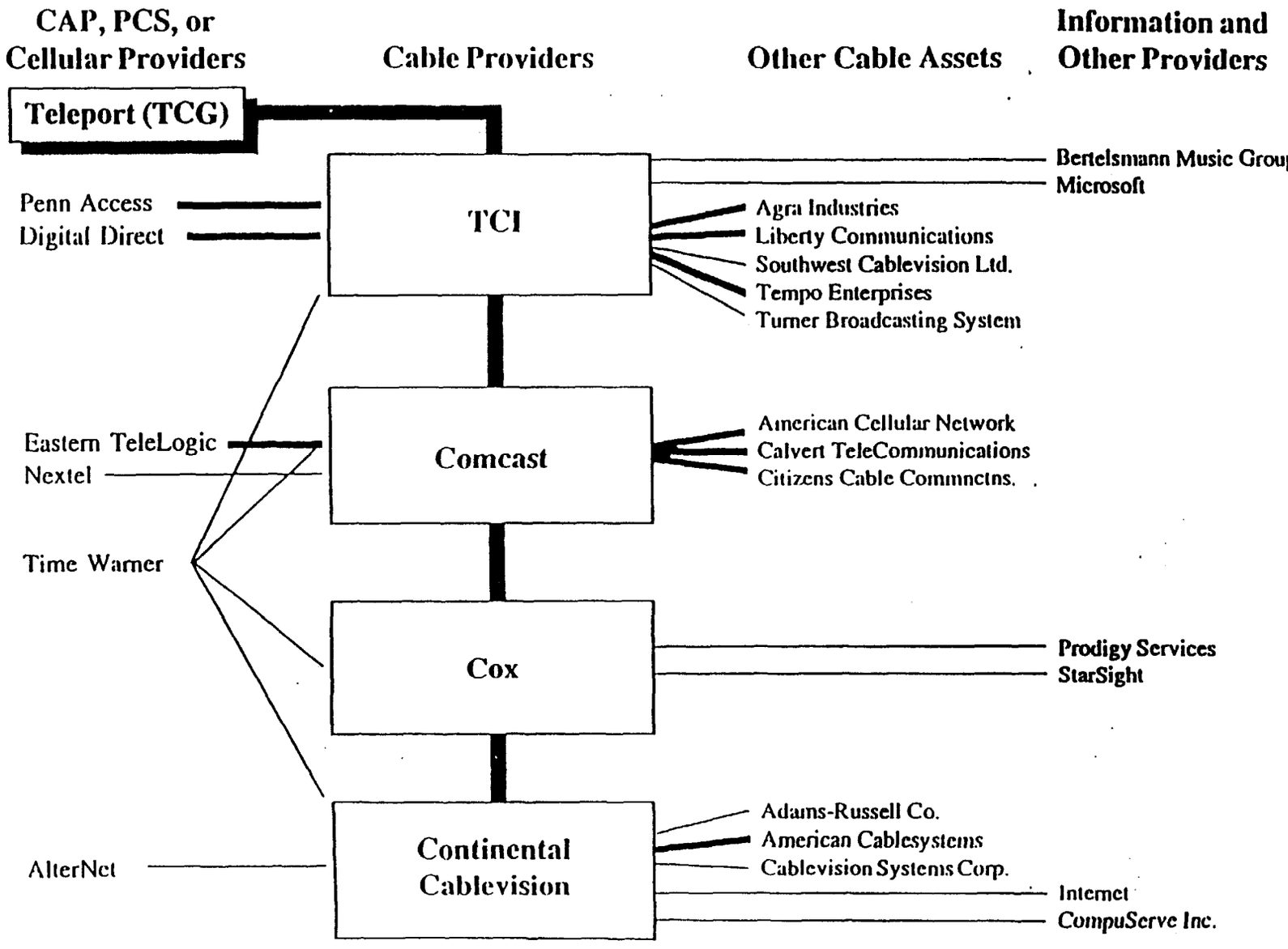


Figure B-9c

Vertical Relationships: Teleport and Cable Providers



ATTACHMENT 3

Price Cap Reform, Financial Incentives and Exchange Carrier Investment

by

Larry A. Darby

Price Cap Reform, Financial Incentives and Exchange Carrier Investment

Statement of

Dr. Larry F. Darby
Darby Associates
Washington, D.C.

In support of

United States Telephone Association Comments
FCC LEC Price Cap Review Proceeding
CC Docket 94-1

May 9, 1994

INTRODUCTION

Early in 1991 the Federal Communications Commission replaced large parts of traditional rate base, rate of return regulation for large local exchange carriers with a form of price cap regulation. Following three years of experience under this provisional scheme, the Commission has initiated a comprehensive review and declared its intention "...to determine whether the price cap plan furthers the development of the telecommunications infrastructure and services that will be needed the years ahead..."[1] In that context, the Commission invited analyses of the effect of its rules on exchange carrier investment incentives and capital formation programs.

The purposes of this paper are: a) to identify the links between the elements of price cap regulation, the requirements of investors, and local exchange carrier (LEC) incentives to invest in the public telephone network (PTN), and b) to determine the directions and assess the strength of such incentives as they relate to additional investment induced by selected, price cap reform measures. The results will be used to provide inputs into the WEFA macroeconomic models, in conjunction with technology adoption studies performed by Technology Futures, Inc. and market development assessments performed by Dr. Robert G. Harris.

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[1] Federal Communications Commission, Notice of Proposed Rulemaking, CC Docket No. 94-1, Price Cap Performance Review for Local Exchange Carriers, February 16, 1994, para. 5, page 2..

CONCLUSIONS

However the Commission decides to weave telecommunications capital formation into the fabric of its broader public interest goals, there is one inescapable fact. The price cap revisions it adopts for the LECs in this proceeding will have a dramatic impact on the level and composition of future telecommunications investment. We are at a crossroads. With respect to telecommunications infrastructure, this proceeding is pivotal.

A review of the relationship between individual price cap provisions, the operation of capital markets, and private sector investment incentives indicates that the following measures provide the Commission the best opportunities to encourage capital market support for accelerated local network investment by Price Cap LECs.

1. Adopt a price cap reform package designed to stimulate LEC investment;
2. Provide pricing flexibility permitting competitive market outcomes;
3. Eliminate regulatory barriers to new service introduction;
4. Eliminate the sharing mechanism; and,
5. Conform the regulatory transition to current marketplace developments.

These measures will reduce regulatory risk and eliminate unnecessary regulatory barriers to market growth and new service introduction, while assuring all suppliers the opportunity to earn on new investment rates of return commensurate with the market risk likely to be incurred. The strength of the inducement to invest will depend critically on the strength of the reforms adopted by the Commission. The reforms listed above would likely stimulate LEC investment in local networks in the near term by five percent growing to a fifteen percent increase over the next decade.

SUMMARY

Managers of local exchange telephone companies and telecommunications holding companies are responsive to the broad public interest and to the forces imposed by the principal markets in which they participate. These market forces are reflected in competition with other service providers, but also in capital markets to which professional managers are strictly accountable for the use of the assets they deploy. Since the securities of telephone companies are publicly traded, their managers are subject to the discipline imposed by the financial objectives and alternative investment opportunities of their creditors and shareholders. Capital markets are intensely competitive and make efficient, value-driven choices among widely differentiated capital allocation and asset deployment patterns.

Managers of local telephone companies under price cap regulation are compelled to be responsive to the investment alternatives and financial goals of investors as a means of attracting low cost capital. Managers have a fiduciary responsibility to shareholders. The penalty for neglecting shareholder requirements is a higher cost of capital and flight of capital to other sectors.

Institutional and individual investors allocate their scarce investment funds to different financial instruments in accordance with their particular financial circumstances and investment objectives. These objectives take several different forms. In most cases, they can be expressed in terms of desires for varying combinations of current income, growth in wealth and security (risk aversion).

The goals of individual and institutional investors are in essential respects conferred upon the professional managers of the real assets to which the financial interests attach. Thus, investor opportunities and objectives are directly translated into similar goals and constraints for the professional managers of telephone companies. LEC managers are impelled by capital market pressures to manage asset deployment and the utilization of cash in ways that tend toward maximization of shareholder value. Maximizing shareholder value requires these professional managers to undertake different activities, like investment, according to reasonable and informed expectations about risk, return and growth.

The ability of managers of local exchange telephone companies to create value for shareholders is constrained by both competitive market forces and by rules and regulations imposed by state and federal regulators. Such rules and regulations influence in the first instance management incentives by changing the financial payoff expected from different courses of action -- including, but not limited to, investing in local public telephone networks.

Through regulation-induced changes in LEC management incentives to invest in public telephone networks, changes in both LEC market conduct (greater investment, accelerated service introduction, service repricing) and the structure of markets in which they operate can be expected. Changes in LEC market behavior induced by regulatory change will create very substantial downstream effects in the user community, thereby leading to increases in consumer welfare and the public interest.

The discussion below responds to specific issues in the NPRM by illuminating the mechanism whereby price cap regulatory reform can have a substantial influence on the incentive and ability of regulated carriers to adopt new technologies, to invest, and to introduce and reprice services. Through a direct and substantial influence on investment risk and expected returns, price cap regulations can either stimulate or dampen LEC incentives to invest in the PTN.

Price cap modifications informed by an appreciation of, and responsive to, the specific constraints and incentives imposed collectively by individual and institutional investors on LEC professional managers will increase the value to shareholders of investment in the public telephone network. This affirmative incentive will stimulate more rapid and diverse capital formation by LECs by attracting capital that will otherwise be deployed elsewhere. Conversely, changes to the existing price cap scheme that are insensitive to the requirements of investors can be expected to encourage them to pursue other opportunities by persuading them that their financial objectives are better served by doing so.

LECs MUST RESPOND TO EFFICIENT CAPITAL MARKETS

The efficiency of capital markets guarantees that the Commission's decision in the price cap proceeding will have significant implications in capital markets.[2] In efficient capital markets, current market prices reflect available information bearing on the value of the securities being traded in that market.[3] Efficient capital markets also ensure that the effect of the Commission's decisions on telecommunications asset values will be fully reflected back to LEC management. Accordingly, LEC management will be forced to incorporate signals into the choices they make about the use of cash generated by the operations they manage. "Good" choices will be rewarded by investors; "bad" ones will be penalized.

Securities prices reflect the best available current estimate of the real value of assets. Efficient markets imply that investors are not fooled by glossy annual reports, creative accounting techniques, or claims of good intentions by management or regulators. Investors quickly absorb and evaluate a wide variety of different kinds of information. Such information is systematically and reliably impounded in the price of the effected company's publicly traded securities.[4]

As the actions of managers are quickly reflected in market prices, so too are the actions of government. Such actions include changes in monetary or fiscal policy that have direct, economy-wide impacts. However, the more particular actions of regulatory authorities are also evaluated by the metric of their impact on market valuations. The competitiveness and efficiency of capital markets imply that investors are informed about the incidence and timing of regulatory rule changes affecting the securities they hold (or may decide to hold); they are able to interpret changes in regulation in terms of their impact on effected securities; and, therefore, they react to such regulatory information in ways that lead to a reflection of that information in

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[2]The "capital market" is a group of interrelated markets for different kinds of financial instruments. Funds are made available in these markets on varying terms and for varying lengths of time. The markets are interrelated by virtue of the fact that funds are mobile from one market to another as investors switch from one type of security to another. Investors trade in response to changes in both general financial conditions and more particular changes in individual industries, but always in pursuit of preferred investment outcomes.

[3] There are different forms of the efficient market hypothesis and they have varying degrees of support. However, under all forms stock prices will come to reflect the type of information conveyed in the price cap proceeding. See discussion of efficient markets in, Richard Pike and Bill Neale, Corporate Finance and Investment: Decisions and Strategies (Hertfordshire: Prentice Hall International (UK) Ltd., 1993), pp. 35-39.

[4]A recent analysis of the meaning of market efficiency concluded: "The overall message for corporate finance managers in quoted companies is that managers and investors are directly linked through stock market prices, corporate actions being rapidly reflected in share prices." Pike and Neale, Corporate Finance and Investment: Decisions and Strategies, pp. 38.

securities prices.[5]

CAPITAL MARKETS ARE COMPETITIVE

The competitiveness of capital markets implies that the professional managers of local telephone companies must vie for investors' favor in several different markets that are rich in options and diversity. Investors have numerous opportunities to invest in different kinds of undertakings,[6] in different kinds of securities,[7] and in different countries.[8] As investment opportunities proliferate and become more attractive outside

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[5] From time to time a particular regulatory action will have clearly perceptible and immediate effects on the value of publicly traded securities. For example, Commission movement toward equalizing access charges paid by the interexchange carriers in 1984 (after years of preferential rates for AT&T's competitors) resulted in a substantial drop in the value of MCI stock. More recently, in September, 1992, the Commission adopted items (in Dockets 91-141 and 91-213) related to competition in the provision of local access for interstate services and to the structure of local transport charges. The market value of LEC stocks declined by roughly 5% (relative to the S&P 500 Index) during the period bounded by the announcement of the items being placed on the agenda and three days after the public Commission meeting. It is important to note, however, that failure of markets to react visibly to a regulatory action does not mean that the action has had no effect. Wall Street reads the trade press and follows regulatory deliberations and processes quite closely, thereby allowing much of the information about probable Commission actions to be discounted and reflected in trading values well in advance of the time of the decision. Recent policy trends combined with the language in Commission Notices often signal reliably the likely resolution of issues and disposition of regulatory matters.

[6] Telephone company securities, both stocks and bonds, trade on the New York Stock Exchange. Telephone stocks compete there with over 2300 other issues on the NYSE ranging from AAR to Zweig. But, equity investors are not limited to the NYSE. They have domestic options on the American Exchange (1100 issues) or the NASDAQ (National Association of Securities Dealers Automated Quotations) "over-the-counter" market (6000 issues). And, there are foreign options as well. LEC stocks compete in a global market with stocks listed on the London Exchange (2700 issues), the Tokyo Exchange (1600 issues), Canadian Exchanges in Toronto and Montreal, and others in national capitals throughout the world. (See Wall Street Journal, April 28, 1994, p. C-4 for sample listings in other world exchanges.) Numerous other issues throughout the world also substitute for LEC bonds.

[7] Stocks vie with other types of financial securities and many investors commonly switch among stocks, bonds (corporate and government), and various types of funds (approximately 4,224 different ones as of June 1993) which may contain either or both stocks and bonds. Traditional equity and debt instruments must contend for investors favor with a variety of "new" financial instruments like stock options, stock futures, options on stock indexes, interest rate options, and the like. Investors do indeed have a baffling array of options. (For a clear and comprehensive presentation of the full range and depth of investor alternatives, see Kenneth M. Morris and Alan M. Seigel, The Wall Street Journal Guide to Understanding Money and Investing, Lightbulb Press, 1993.)

[8] Large investors in telephone company stocks frequently hold both domestic and foreign issues in their portfolios, so that telephone stock performance comparisons are truly international. For example, Capital Income Builder, Inc., Flag Investors Telephone Income Fund, The Prudential Global Utility Fund, The Dean Witter Utilities Fund, IDS Utilities Fund, and many others have large holdings of both U.S. telephone company securities and foreign telephone interests. Further, one major Wall Street investment firm titles its periodic telecommunications investment research reports "World Telephone

the local exchange telephone sector and outside the U.S., the financial performance of telephone company assets deployed for the provision of local access and distribution must improve accordingly if they are to remain competitive and attractive to investors.

LEC AND RHC INVESTORS ARE NUMEROUS AND VERY DIVERSE

While investors have numerous and varied investment opportunities, a large number of them choose at any given time to hold LEC securities. Most citizens are investors. Many have a direct financial interest in local exchange telephone companies. Not everyone directly owns telephone company shares, but they may have a stake through their holdings of other forms of wealth. Most citizens participate in investment programs designed to store and build wealth and to provide retirement income. Whether through an employee pension plan funded by an employer; or through a Keogh Plan; or through an individual retirement account, the funds saved and invested for retirement purposes by citizens find their way into securities markets where LEC stocks and bonds are traded. Given the broad and diverse ownership of LEC and telephone holding company stocks, many Americans have a primary stake in the industry as shareholders.[9]

Investors' financial circumstances vary enormously. Thus, investors have widely differentiated objectives and time horizons to govern the allocation of their

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Industry Monthly", while another surveys world telecommunications investment opportunities in an annual "Global Telecommunications Review". See, John Chessher and Francis Woollen, "Global Telecommunications Review," published by Paribas Capital Markets, May 1993; also, Robert B. Morris III and Julie E. Kennedy, World Telephone Industry Monthly, Goldman Sachs Investment Research, February/March 1994. Trends toward privatization and deregulation abroad, combined with the frequently noted "globalization" of the world economy, will intensify the rivalry among national telephone securities.

[9]The results of a recent Darby Associates survey indicate that institutions, including banks, insurance companies, investment companies, investment advisors, pension funds, brokers and a variety of other domestic and foreign portfolio managers account for a third or more of the stock ownership of most of the large LECs. Individuals typically own more than half the outstanding stock of large LECs, but there is a wide dispersion about the average when holdings are compared across companies. From five to fifteen percent of the stock of a typical LEC is held by employees or retirees of the company.

While a more specific demographic breakdown of RHC/LEC stock is not available, it probably reflects fairly closely the distribution of ownership of stocks more generally. By 1990 over 51 million citizens owned stock in a publicly traded company or stock mutual fund. This represents a doubling since 1975 and more than a 70% increase during the decade. There were nearly 25 million mutual fund holders, a large number of which hold LEC or RHC stocks. About three-fifths of the adult shareholders had incomes of less than $50,000, while retirees are more than one in five of all adult stock owners. Almost sixty percent of shareowners in 1990 were outside the professional and managerial class. They were clerical and salespeople (15.5%), craftspeople and service workers (13.5%), laborers and farmers and homemakers or in the armed forces (8.3%) or retired persons (20.7%). About half had 1 to 4 years of college, while the other half was divided evenly between high school grads and those with some postgraduate work. Average holdings are not large, as indicated by the fact about two-thirds of all shareholder portfolios were valued at less that $25,000. See, New York Stock Exchange, "Shareownership 1990".

limited investment funds across the numerous investment opportunities available. Despite the diverse circumstances, however, investors' preferences can be summarized by their attitudes toward a few key attributes of financial securities.

INDIVIDUALS AND INSTITUTIONS BALANCE RISK, RETURN AND TIMING

The financial objectives of individuals generally vary according to their age, current income and tax status, time preferences -- as between consumption today and consumption tomorrow -- and attitudes toward risk or security.[10] The investment requirements implied by each of these individual characteristics are in some measure re-enforcing, but are also frequently in conflict. Conflicting objectives require investors to balance one investment objective against another, thereby optimizing overall.

Centuries of historical data support the intuitive notion that risk and reward are related and move in opposite directions. Thus, investors seeking and expecting higher returns must be prepared to sustain higher risks (less security).[11] Further, investors may prefer immediate returns generated by current earnings or appreciation (growth) in value over time.

The preferences and goals of individuals are reflected in the objectives of institutional investors. There are thousands of different investment funds catering to the investment goals and objectives of particular groups of individual investors. Institutional investors, like individual investors, must also balance among conflicting objectives -- security, current income, and long term appreciation.[12] Different funds place different weights on these objectives, but all are sensitive to the performance of their portfolios in each of those dimensions.

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[10]Our discussion focuses on stocks rather than bonds. From an investors point of view stocks and bonds have quite different characteristics. Bondholders are creditors. They are paid specified amounts per year (hence the name "fixed income" securities) and their claim on income and assets is senior to that of stockholders. Stocks represent ownership, with no assured return, but with some upside income potential as the residual claimant. Bonds are "safer" with downside protections, while stocks are riskier and with more opportunity for growth. See Richard Saul Wurman, Fortune Guide to Investing in the 90's, Simon & Schuster, Inc., 1993, pp. 16-24, 36-44. Limiting the discussion to stocks permits simplification without sacrificing either the accuracy or implications of the analysis.

[11] This basic trade-off was rather comically expressed by J. Kenfield Morley and quoted by Malkiel in his classic, A Random Walk Down Wall Street: "In investing money, the amount of interest you want should depend on whether you want to eat or sleep." (p. 267) Malkiel adds an anecdote about J.P. Morgan's advice to a friend who was worried to the point of insomnia about the performance of his stock holdings. " What should I do about my stocks?", the friend asked. "Sell", Morgan replied, "down to the sleeping point." p. 271.

[12] The description in the prospectus of the Flag Investors Telephone Income Fund is representative of the goals of such funds.

"First offered in January 1984, the fund seeks current income; long-term growth of capital without undue risk is a secondary objective."

STOCK VALUES DEPEND ON PERCEIVED RISK AND EXPECTED RETURN

There are several ways to value a stock. A widely used method, the dividend discount model, indicates that the price of a stock varies positively with the dividend and the expected dividend growth rate, but negatively with the discount rate or the cost of equity capital.[13]

The dividend discount formulation of stock values and the determinants of the cost of capital to a LEC indicate that regulatory programs can influence both stock values and the cost of capital. The effects of regulation are realized through their influence on earnings, growth and risk of regulated companies.

CAPITAL MARKETS RECOGNIZE AND DISCOUNT "REGULATORY RISK"

The required return on the stock of a regulated telephone company can be usefully viewed in another way by breaking it down into the following parts:

"Risk Free" Rate of Interest
+ Inflation Premium
+ Corporate Risk Premium
+ Equity Premium
+ Company Specific Market Risk
+ Company Specific Regulatory Risk

= $\mathbf{K_e}$ = Required Return on Common Equity

The "Risk Free" interest rate represents the pure time preference of investors as between current income and future income -- without regard to any risk from loss of value from inflation or otherwise. Adding consideration for expected inflation yields the market required return on risk free debt -- long treasury bond yields are the preferred

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[13]This is the "Classic" DCF formulation previously adopted by the Commission. It can be written as: $P = \frac{D}{K-G}$ The Commission has rearranged the relation to highlight stockholders' required return on a specific stock, i.e. the cost of equity, and called it K_e. Here the $K_e = \frac{D}{P} + G$ dividend yield, D/P, plus expected growth, G, expresses the total return required by investors. As explained by the Commission, "The DCF formula assumes that the current market price of a firm's stock equals the present value of the cash flows that investors expect from that stock. The DCF formula discounts to the present the value of these cash flows to determine the investor's required return or the cost of equity." Federal Communications Commission, CC Docket No. 89-624, In the Matter of Represcribing the Authorized Rate of Return for Interstate Services of Local Exchange Carriers, Adopted: September 19, 1990; Released: December 7, 1990; paragraph 103.

measure.[14] Adding compensation for corporate risk gives the approximate return required on corporate debt. Equity holders must be compensated for the additional risk exposure resulting from their subordinate (to bondholders) claim on the company's assets and cash flow.[15]

Considering the equity premium as the average for all equities, then the market specific risk factor may be either positive or negative depending on the "Beta" of the specific stock.[16] Since divestiture a considerable spread in the relative valuations of the different RHCs has emerged. Analysts have found the basis, both inside and outside the companies' core regulated businesses, for regarding the companies as differentially risky. Similarly the company specific premium for regulatory risk may be either positive or negative. It depends on whether investors regard regulation as adding or detracting from the company's market risk.

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[14]Changes in the value of RHC stocks in recent years have been closely tied to changes in interest rates. Utility stocks have traditionally been influenced by conditions in credit markets. When interest rates have been high, utility and telephone dividend yields have been high, and vice versa. The relationship is attributable to the fact that utility stocks traditionally trade like bond substitutes. Declining interest rates indicate declining current yields and yields to maturity on bonds, which lead investors to switch to reliable dividend paying stocks, like telephone stocks have been historically. John Bain of Raymond James Associates estimated a simple least squares regression, for the eight years following divestiture, of current yields on RHC stocks on the 30 year treasury yield. The regression equation was Y=ml + b, where Y is the current yield on the stock and l is the yield on 30 year treasuries. The coefficient, m, ranged from .679 to .845. The R^2s for the RHCs ranged from .75 to .88. If interest rates increase, as is apparently being anticipated by capital markets today, the expected result, other things equal, will be a decline in the value of LEC stocks. John Bain, "Interest Rate Sensitivity of Telecommunications Common Carriers", Industry Comment, Raymond James & Associates, Inc., June 2, 1992. See also Bain's earlier study, "Interest Rates and Telephone Stock Prices", Raymond James & Associates Inc., August 1, 1990.

[15]In this context of the need to be compensated for risk, a leading bond rating agency recently observed: "The implications of the increasingly competitive environment are coming into clearer focus. Business risk in the local exchange is increasing." Further, "...niche competitors target only the most profitable, high-volume customers, [and] they often have lower fixed investment. This leads to lower depreciation charges and lower capital costs. Lower costs combined with artificial pricing subsidies forced onto the telephone companies by regulators, lead to significant price advantages for many competitors. Price competition leads to lower margins and more volatile earnings." Duff & Phelps Credit Rating Company, "Credit Trends in a Competitive Environment", August, 1993, p. 1. This passage clearly identifies federal regulatory changes as sources of additional market risk and additional regulatory risk, as viewed by professional monitors of the security of LEC bonds.

[16] The term "Beta" describes a comparison of the price movement of an individual stock (or portfolio) relative to price movements of the market as a whole. Analysts have broken down the movement of stock prices into two components: movements attributable to changes that effect all stocks and changes that only effect the stock (or portfolio) in question. If, for example, a stock has a Beta value of 2, that means that on average its price swings are twice the average variation of prices in the market. It is therefore a more risky stock. Beta of .5 implies half the riskiness of the overall market. See Malkiel, Random Walk, pp. 228-37 for a more detailed, and easy-to-understand, explanation of these relationships.

Regulatory risk can influence the required return in several ways and via different avenues. For example, it has been argued from an historical perspective that regulatory risk was negative for local telephone companies in the sense that regulatory entry barriers protected them from the rigors of a competitive marketplace and, thereby, reduced the market risk they otherwise would have faced. Competition policies over the past decade have reversed this risk profile.

There are several indications that the market accords significant weight to regulatory risk or the "quality of regulation" in valuing LEC stocks. Both securities analysts and large portfolio managers carefully track regulatory trends and key, "big ticket" regulatory activities, including the price cap proceeding. Analysts consistently mention regulatory requirements and constraints in their analyses and stock recommendations. Some rank the state public utility commissions.[17] At least one analyst has suggested that regulated properties should be divested by its holding company, because of the pervasive adverse impact of the state regulation there on the company's value.[18]

Regulation may increase regulatory risk and shareholders' required return by imposing rules and requirements that otherwise would not exist in a free market. Risk-increasing regulations include those that:

1. Impose requirements for service at noncompensatory rates (uncompensated service requirements).[19]

[17]Christopher F. Swenson and Herbert R. Maher, "Industry Bulletin", Hancock Institutional Equity Services", June 1993, p. 4.

[18] See, Paul G. Aran, New Purchase Recommendation, Southwestern Bell Corp., Bear Stearns, February 14, 1994, p. 4.

[19]The Kidder, Peabody analyst observed: "Historical subsidies have created basic service prices below costs... The combination of the social-minded universal service goal and the politically sensitive nature of basic residential rates has resulted in a subsidy pricing structure. Profits from other telecommunications services...subsidize basic local rates." Further, "As one would expect, large profit margins attract competitors and encourage customers to look elsewhere for more reasonably priced services." Steven R. Yanis, The Phone Book -- The Local Telephone Industry and the Regional Holding Companies, Kidder, Peabody & Co., Summer, 1993, at p. 5. Another analyst observed: "...regulators have traditionally forced BOCs to price local telephone service far below the cost of providing it." Further, "In order to recover these subsidies, most states allow local phone companies to charge higher rates on intrastate toll and access and the FCC allows a portion of these subsidies to be absorbed in interstate access charges as well." Anthony Ferrugia, "Regional Bell Operating Companies", A. G. Edwards & Sons, Inc., October 1, 1993, p. 3.

2. Restrict the ability to price services competitively or in ways otherwise consistent with costs.[20]

3. Restrict the number and/or pace of new service introductions.[21]

4. Limit the rate at which the costs of durable, capital equipment may be recovered, by imposing nonmarket-based, economically arbitrary accounting restrictions on current depreciation charges.[22]

5. Create barriers to expansion into related lines of business, especially those for which economies of scope are available for the expanded use of existing or planned plant.[23]

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[20]One analyst observed: "...LECs have limited pricing flexibility... True, the FCC established zone pricing flexibility for access services; however, rates remain subject to an overall price cap mechanism effectively limiting true pricing flexibility." Guy W. Woodlief, "Telecommunications Industry: The Times They are A-Changing," Dean Witter Equity Research, December 30, 1993, p.9. Credit rating agencies are also concerned about pricing flexibility. Duff and Phelps recently observed: "Alternative regulatory plans which allow for earnings sharing have given the LECs the incentive to achieve operational and capital efficiencies. As a result, they have become more competitive. However, much greater pricing flexibility still needs to be granted. Pricing flexibility will allow the LECs to minimize the artificial pricing subsidies that tilt the competitive balance to the benefit of nonregulated companies." James R. Stork, "Credit Trends in a Competitive Environment", Duff and Phelps, August 1993, p.3.

[21] There is recognition in the financial community that pricing and service innovation together are important sources of revenue growth that may offset, in part, the increased business risk of open entry. "Pricing flexibility will also allow the LECs the freedom to price and package their services in innovative ways that hopefully will stimulate revenue growth." Duff and Phelps, page 3.

[22] According to one analyst: "First, current depreciation expense has no bearing on the true cost of PP&E utilized to provide telephone service, meaning that current earnings are not a good reflection of the economic return generated by the telephone company. Depreciation rates have historically been set at very low levels by regulators whose primary concern in a monopoly environment has been to maintain low rates. Since regulated companies are allowed a return on investment after expenses, the lower the expenses were kept, the lower the rates needed to be. Unfortunately, that means that LECs have underdepreciated their existing plant... For those that choose to increase their depreciation rates, earnings growth will be penalized even though the underlying business fundamentals (and cash flow growth) have not changed." Guy W. Woodlief, "Telecommunications Industry: The Times They are A-Changing," Dean Witter Equity Research, December 30, 1993. For a detailed analysis of depreciation accounting and its financial impacts, see: Jack Grubman, "Rating Change, Technology Group -- US West", PaineWebber, September 20, 1993, at pp. 2-5.

[23]"While technology -- like the market -- affords opportunities, regulation has often limited the potential for benefits..." and, furthermore, "...regulatory policies [reduce] the RBOCs ability to seek synergies by vertically integrating into cable television, information services, and long distance." Paul G. Aran and W. Todd Scott, "New Purchase Recommendations", Bear-Stearns Equity Research, February 7, 1994, p. 8; see also Charles W. Schelke and Carl H. Blake, "Large Telco Rating Changes", Smith Barney Shearson, January 10, 1994, for an indication of the importance of these restrictions. In a discussion of their regulatory and legislative concerns they observe: "...the regulatory and political

6. Increase risk and uncertainty as a result of regulatory lag.[24]

7. Increase the variability of carrier operating and administrative burdens resulting from the costs of complying with assorted regulatory requirements, including imposition of varied reporting and monitoring requirements. [25]

Inasmuch as these and related regulatory measures increase regulatory risk and the required return on equity from the point of view of shareholders, there is the clear implication that regulators can stimulate investment in LEC securities by taking steps to eliminate or reduce the incidence and severity of these and other risk-inducing regulatory practices.

LECs MUST BE RESPONSIVE TO SHAREHOLDER OBJECTIVES

The decisionmaking discretion of professional managers of local exchange companies is constrained by three principal forces: a) market discipline imposed by customer needs and the options customers may have to choose among competitive suppliers; b) regulatory or judicial restrictions and obligations imposed by state and federal agencies and policies; and c) the capital market discipline imposed by investor objectives and alternative investment opportunities.

Economic value created for shareholders is widely recognized in the business community as the measure for judging management and the success of their business strategies.[26] Subject to the constraints of the social, legal and regulatory environment within which they operate, management is obliged to maximize the wealth of the owners of the assets they manage.[27] Given the active and efficient market in LEC

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environment is a critical area to monitor." p. 3.

[24]Kenneth M. Leon and Thomas J. Calcagnini, "U.S. Telecommunications Services, Monthly Report", Lehman Brothers, at p. 24 observe: "Regardless, regulatory lag is likely to remain the order of the day in telecommunications, thereby continuing to present an opportunity for alternative-service providers..."

[25]...[price cap regulation] also eliminates the need for expensive studies and time-consuming debate over what are ultimately very arbitrary cost allocations." Duff and Phelps, page 3.

[26]Alfred Rappaport, Creating Shareholder Value -- The New Standard for Business Performance, The Free Press, 1986, p. xiii. See also two recent articles in Fortune on "Economic Value Added", a shorthand term for shareholder value: Shawn Tully, "The Real Key to Creating Wealth", Fortune, September 20, 1993, p. 30; and Laura Walbert, "America's Best Wealth Creators", Fortune, December 30, 1993, p. 64. Maximizing shareholder value is roughly consistent with theories of managerial behavior put forth by academic economists, including theories that emphasize short and long term profits maximization, "satisficing" behavior, revenue maximization, and others.

[27]For a discussion of the extent to which managers must reflect shareholders goals in their decisionmaking and the "fiduciary" obligations of management see Pike and Neale, Corporate Finance and Investment: Decisions and Strategies, pp. 11-24 and the references cited there.

securities, LEC stock prices should provide reliable indications of asset value and management performance. When all is said and done, the overriding responsibility of professional managers is to shareholders -- the owners of the assets.

In short, capital markets provide the link between LEC shareholders and professional managers, thereby ensuring that shareholder goals are reflected in LEC market strategies and investment programs.[28]

LEC INVESTMENT CHOICES ARE DRIVEN BY EXPECTED RETURNS

The channels of regulatory impact on LEC investment can be identified by considering investment in the public telephone network in the context of alternative uses of cash generated by telephone operations. The local exchange business can be regarded as a financial system of funds flows among three closely interlaced subsystems -- operations, investment, and finance. Operations involve functions such as asset utilization, pricing and product strategies, personnel, general and administrative management, and other matters identified with the generation of sales revenues and the management of costs. Operations serve as both the major source and use of cash.

Cash from operations is used in part to pay interest to bondholders. After taxes, the remainder is available for allocation to other competing uses. A part is distributed to shareholders as dividends. The remainder is available for investment. If the LEC's desired investment should in the future exceed the cash made available from operations, financial managers will have to take steps to raise cash externally.[29]

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[28] In annual reports to owners, managements typically recognize their obligation to enhance shareholder values. The following statements give the general tenor for a handful of LECs: "At GTE... we remain committed to fulfilling three main objectives: ...to maximize shareholders' long term total return, as measured by share-price appreciation and dividends". Similar commitments are expressed by Bell Atlantic. "...our obligation [is] to make sure every dollar spent benefits our customers as well as our shareowners [and] ...our principal concern is building shareholder value for the long term." Ameritech stated: "Management's primary objective is to increase share-owner value over time." Similarly, Rochester Telephone Corp. concludes: "Management decisions must be made based on the value they will add to the shareowners' investment."

[29] The amount invested in local exchange networks is determined, in principle, by comparing the expected return from such investment with its opportunity cost (the values foregone by not exploiting other alternatives). Shareholder value is increased by reinvesting earnings, if, and only if, the net present value of the reinvested earnings exceeds the value placed on dividends by shareholders. The latter of course depends on the returns available to shareholders from other uses. While there are several different investment appraisal methods used, all involve comparing the values of alternative uses of cash. See Pike and Neale, Corporate Finance and Investment: Decisions and Strategies, for a good discussion of investment valuation and capital rationing techniques (pp. 107-125). Historically, many telephone company shareholders have found telephone stocks attractive because of their record of relatively high earnings payout rates and regular dividend payments. Changing that practice would, of course, adversely affect the value perceived by such shareholders.

All companies -- regulated or unregulated -- must budget scarce capital. A principal task of management is to allocate cash (not required by current operations, taxes, or dividends) among competing uses, all of which may add value for shareholders. Like investors in financial securities, professional real asset managers must distribute limited funds among a large array of alternative investment opportunities. They are constrained to a budget consisting of internally generated cash and external funds available in capital markets. Given the cash budget constraints, managers must choose between paying dividends and investing in current or new businesses. They make these choices based on the expected value to shareholders of different allocations and the signals they get from capital markets. After full consideration of risk, return and prospects for growth, highly valued investment projects get funded; projects that appear likely to generate inadequate returns do not.

Given cash generated, but not used, by telephone operations, managers must decide: a) How much to invest, and b) what investment "projects" to undertake. In this regard, four key points are of consequence in considering the impact of regulation on the level and composition of investment in local public telephone networks.

First, the amount invested in the public telephone network depends on the expected value of different levels of investment relative to the value placed on the cash by asset owners -- the opportunity cost of capital.[30] Thus, the level of LEC investment will be determined by the relationship between the opportunity cost of capital and the return anticipated for different levels and types of investment

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[30] Confronted by regulatory change that reduces market valuation -- by increasing business risk and/or reducing expected growth in the core business lines -- the incumbent has several avenues for attempting to restore the lost value. In terms of the basic valuation model discussed above, the incumbent must take measures to bring about offsetting changes in risk and growth. Examples of such offsetting changes include:

1. Repricing competitive services in an attempt to reduce loss of market share, contribution, operating cash flow;
2. Improving service quality;
3. Increase nonprice competition -- via advertising, promotions or other sales boosting;
4. Cutting costs to improve operating margins;
5. Introducing new services; and,
6. Seeking strategic investments and/or acquisitions (geographically and/or commercially) outside the core regulated telephone business.

While the incumbent may try any or all of these, the best that can be done is to minimize the losses. There is no good, clear-cut strategy that will restore fully the initial value of the firm or of its stock. However, to the extent that regulation restricts the ability of the company to pursue any or all of these avenues, the decline in the value of the company will be greater; the cost of capital will be higher; the incentive of capital markets to underwrite investments in the core business will be lessened; and, pressure on professional LEC managers to seek other uses of cash outside the PTN will be greater.

undertaken. Other things being equal and for a given cost of capital, investment will be higher the greater the present value of the benefits to be generated.

Second, the FCC has an effect on the level of investment in local telephone networks through the impact of its rules on market risk (which effects the cost of capital and the discount rate); the impact of its rules on regulatory risk (as discussed in the preceding section); and the impact of its rules on the stream of expected future benefits (which includes expected earnings and prospects for growth).

More specifically, the FCC's rules influence the cash allocation and investment process in a number of ways: by requiring or prohibiting certain kinds of LEC investment; by influencing operating margins through cost allocation procedures and rate regulation; by constraining the ability to maintain cash flow by repricing competitive services; by limiting the ability of LECs to increase revenue and cash flow by timely introduction of new services; and by reducing the prospects for full and timely recovery costs (including a fully compensatory risk-adjusted return). As discussed further below, price cap reform can be critical in each of these respects.

Third, investment and financing decisions are made within the broader context of the company's overall business strategy. Different companies will find different investment levels and composition optimal. The companies are not homogeneous. Local exchange carriers and the holding companies are beginning to diverge and pursue different corporate development strategies. These differences reflect variations from one company to another in a) business fundamentals and business risk in their respective territories, b) regulatory risk in different jurisdictions, and c) the skill sets developed since divestiture.

Fourth, local exchange companies and telephone holding companies have a large array of potential investment opportunities available. In recognition and furtherance of their fiduciary responsibility to shareholders, LEC professional managers are obliged to evaluate the full array of available cash allocations and investment opportunities in the context of the potential value of each to the owners of the assets. Again, by exercising control over different aspects of market supply in some markets, but not in others, regulators have the ability to induce or discourage investment in particular regulated sectors and in particular kinds of plant and equipment.

MODIFYING PRICE CAPS WILL INCREASE LEC INVESTMENT INCENTIVES

However the Commission decides to weave telecommunications capital formation into the fabric of its broader public interest goals, there is one inescapable fact: the price cap revisions it adopts for the LECs in this proceeding will have a dramatic impact on the level and composition of future telecommunications investment. We are at a crossroads. With respect to telecommunications infrastructure, this proceeding is pivotal.

The Commission will be confronted in the future with other opportunities to encourage capital formation through the effect of its rules on carrier incentives. Nevertheless, the Commission's opportunity to influence capital formation will be no greater than in this proceeding. LEC price cap carriers constitute major potential sources of investment funds for evolving digital broadband networks that will be the core of the National Information Infrastructure (NII). This proceeding will influence, and influence in significant ways, each of the principal components of the carriers investment incentive structure.

The uncertainty of major capital market players about future market developments is compounded by their concern and conjectures about the future regulatory framework within which local exchange markets will operate. Investors are well informed about both technological and market opportunities, and about the market risks that inhere in the adoption of new technologies and provision of new services. What is missing from the market's decisionmaking calculus is what is being determined in this proceeding; namely, the regulatory ground rules for determining whether committing large amounts of risk capital to upgrading local exchange networks is warranted in light of the risks involved -- considered in the context of other investment opportunities.

The requirements of investors, individuals and institutions alike, will constrain professional managers of local exchange companies to make only those investments that can be reasonably expected to yield returns commensurate with investor perceptions of the risks involved and the opportunity costs (returns available elsewhere) of the capital to be committed. As explained above, capital markets are efficient, global and very competitive, thereby giving investors virtually countless other outlets and opportunities for seeking to maximize their financial returns. Moreover, in the vast majority of those cases there is no government imposed limitation on market generated rates of return.

Past investment in the PTN had a very different risk profile from that of the investment requirements implied by most discussions of the NII. There are several reasons for the difference -- two critical ones.

First, most of the embedded plant now in place was installed under market conditions very different from those successfully fostered by rapid technological change and the Commission's competition policies opening entry and expanding interconnection opportunities for new entrants. The bulk of current plant and equipment was installed under conditions of regulated monopoly, protected in large measure from the rigors of marketplace competition. As the result of substantial regulatory change, that protected monopoly status has yielded to a much different

marketplace -- one that is less protective and far more competitive.[31] But, as the Commission observed in the NPRM, "...these changes, as important as they are, are only a prelude."[32] Today's marketplace is more competitive than yesterday's, and the marketplace in which the cost of today's investment will be recovered will be even more competitive.

Second, the future demand for digital, broadband services is less well known and less predictable than for the set of basic services now being provisioned on today's network. We know a lot about the stability and reliability of the total market for POTS, even if competition renders less certain the demand for the services of a particular carrier. However, demand for the new "digital, interactive, broadband multimedia" services available from the network of tomorrow is far less certain. And, that market, too, will be more competitive than at present. In short, and for these reasons, market risk, the cost of capital, and the returns required to bring forth the necessary investment will be higher accordingly.[33]

The Commission has signalled its intention to foster competitive alternatives to LECs networks as the "stick" for increased LEC network investment, while using its price cap rules to provide the opportunity and the "carrot" for doing so: "We will continue to support the development of competition; through the implementation of price cap regulation, we intend to provide LECs with the opportunity to continue their efforts to modernize the communications infrastructure and to maintain a level of investment which will lead to implementation of an intelligent, interconnectable broadband public network."[34] The Commission's competitive policies are working.

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[31] The Commission's words express the changes aptly: "Within the last few years, however, we have witnessed dramatic changes in telecommunications technologies and markets, especially changes leading to lower prices and greater usage of telecommunications as networks are interconnected and opened to competition. The Open Network Architecture tariffs, expanded interconnection, 800 data base technology, video dialtone, and the allocation of spectrum for wireless Personal Communications Services are all examples of the increasing capability of the telephone network, and all contribute to making that network open to market forces." Price Cap Performance Review for LECs, NPRM, p. 2.

[32] Price Cap Performance Review for LECs, NPRM, p. 2.

[33] One analyst, in the context of a discussion of the plans announced by four of the seven RBOCs to upgrade their networks in order to provide interactive, broadband services, expressed his reservations in very clear terms: "We question whether the increased capital expenditure plans will prove worthwhile, as we are concerned about the risk that incremental revenue in value-added services would be smaller or realized later...and believe a conservative capital expenditure program is wiser given that uncertainty. Though heretical amidst today's enthusiasm for fiber optic information highways, lower capital expenditures could result in more cash available for strategic investments or perhaps some form of extra dividend." Daniel Reingold, CFA, "RBOCs and GTE: Fourth Quarter Review; Gearing up For Competition", Merrill Lynch, February 7, 1994, pp. 2-3.

[34] Federal Communications Commission, CC Docket No. 89-624, In the Matter of Represcribing the Authorized Rate of Return for Interstate Services of Local Exchange Carriers, Adopted: September 19, 1990; Released: December 7, 1990; paragraph 355.